Chino Landscape Restoration Project Fuels Specialist Report

Submitted by: _____

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Introduction

The purpose of this report is to evaluate the potential environmental consequences of prescribed fire within the Chino Landscape Restoration Project. The report will describe the current condition of vegetative communities and corresponding Fire Regime Condition Class (FRCC) ratings across this landscape. This report will also discuss the consequences of the proposed action and an alternative that does not include any road decommissions, closures, or restrictions.

Direction for all management activities on the Prescott National Forest (Prescott NF) is drawn from the 2015 *Land and Resource Management Plan for the Prescott National Forest* (Forest Service, 2015) (hereinafter referred to as the Forest Plan). This plan categorizes vegetation on the Forest into Potential Natural Vegetation Types (PNVT) or areas that share similar climate, soils, vegetation and natural disturbances. There are nine fairly distinct PNVT's present within the analysis area. They include:

- Piñon-Juniper / Evergreen Shrub (246,950 acres)
- Juniper Grassland (82,450 acres)
- GB Grassland (25,750 acres)
- Ponderosa Pine – Evergreen Oak (24,200 acres)
- Piñon-Juniper Woodland (17,300 acres)
- Ponderosa Pine- Gambel Oak (15,150 acres)
- Interior Chaparral (9,900 acres)
- Riparian Gallery (3,500)
- Semi-Desert Grassland (2,450 acres)

The vegetation need for change statement reads "Restore vegetation structure and composition and desired characteristics of fire to selected ecosystems."

The objective common to all PNVTs excepting riparian reads "Wildland fire includes prescribed fire and wildfire managed to meet resource objectives. Both tools would be used to maintain or trend toward desired conditions. The opportunity to manage wildfires to meet resource objectives cannot be predicted; however, when conditions allow, such wildfires would be used in conjunction with prescribed fires to meet acreage targets." The emphasis of the plan direction is to improve PNVT health using appropriate treatments emphasizing wildland fire and complimented by mechanical treatments to improve ecological health benefitting wildlife habitat and watershed function.

Purpose and Need for Action

The overall purpose of the Chino Landscape Restoration Project is to restore and maintain soil and watershed function, Vegetation conditions, riparian and ground water dependent systems, and natural fire regime. The goal is to move the landscape towards desired conditions described in the Forest Plan and improve wildlife habitat for pronghorn antelope, threatened and endangered fish species, and migratory birds. The treatments, which will consist primarily of ponderosa pine, juniper and shrub thinning and prescribed burning, will also improve the function of the watershed by increasing the forb and grass components, thereby reducing soil movement and increasing water quality and quantity available for wildlife and riparian communities.

Summary of Alternatives

Proposed Action

The proposed action would allow for restoration projects using mechanical means such as chainsaws and mastication or by using management ignited or prescribed fire, natural ignitions or a combination of mechanical and fire treatments. The mechanical methods most likely incorporated would be use of chainsaws to thin standing trees and other vegetation and either lop and scatter the cut material or pile the material and burn it at a later time. Heavier equipment may also be considered in these areas using large mower heads or horizontal cylindrical cutting heads to chop or masticate the vegetation. This masticated material may or may not be burned at a later time depending on overall project objectives.

Alternative A

Alternative A includes the vegetation treatments, erosion control measures, and recreation use and RATM route mitigations described for the proposed action, but does not include any road decommissions, closures, or restrictions.

Methodology and Analysis Process

The analysis of the environmental consequences of the alternatives is based on the best available science and the professional judgment of the author.

Assumptions

In the analysis of the project alternatives, the following assumptions have been made:

- Existing vegetative conditions and protocols for resource protection will persist unless changes are initiated by an action alternative.

- If an alternative other than No Action is selected, then using fire as a management tool will require adaptation to both short and long term weather conditions and trends to successfully meet management goals and objectives.
- The implementation period for this analysis is ten years or as long as the environmental consequences are applicable and consistent with desired conditions.

Affected Environment

As described earlier there are nine distinct vegetative types found within the project area boundary. These are Piñon-Juniper Woodland, Piñon-Juniper Evergreen Shrub, Semi-Desert Grassland, Great Basin Grassland, Juniper Grassland, Interior Chaparral, Ponderosa Pine - Evergreen Oak, Ponderosa Pine - Gamble Oak, and Riparian Gallery. No active treatments are proposed in two of these PNVTs - Semi-Desert Grassland and Riparian Gallery.

The Prescott NF borders the Coconino, Tonto and Kaibab National Forests. During periods of high prescribed fire activity, when it is likely that each of these forest are conducting prescribed burns, there are weekly coordination meetings thru Arizona Department of Environmental Quality (ADEQ). These coordination meetings help to ensure that prescribed burning activities on all forests in the state are not exceeding air quality standards.

Data on the existing condition of the vegetative types comes from the *Terrestrial Ecosystem Survey[1] of the Prescott National Forest* (Robertson et al., 2000), the Prescott National Forest Ecological Inventory (EI), the *Ecological Classification of the Prescott National Forest* (EC) (Forest Service, 2006), and from field notes, inspections and riparian site visit documentation. This information is discussed in detail in the *Chino Landscape Restoration Vegetation Specialist Report* (Forest Service, 2018).

Historically fires burned in most PNVT types within the Chino Landscape Restoration Project as well as across the Prescott National Forest. These fires historically burned frequently with a mixed fire severity. Ponderosa pine would normally burn with a high frequency and low severity. Grasslands would also burn with high frequency and low severity. Interior chaparral has a high fire severity with a fire frequency of once every 35 to 100 years. Piñon-Juniper sites would burn less frequently with high severity. Riparian sites would burn low frequency with high to mixed severity. The majority of lightning ignitions took place during the monsoon season, typically June through September. Past mismanagement of cattle grazing and an aggressive wildfire suppression policy dramatically changed the role of wildland fire within the project area. Fire occurrence and size has been reduced due to a lack of continuity of fine fuels that would carry the fire.

Past events such as the 779 acre Woodchute Fire in 2009 and the 626 acre Perkinsville Fire in 2014 have contributed to the current conditions on specific sites within the analysis area. More recently, during the

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[1] Since the completion of the *Terrestrial Ecosystem Survey of the Prescott National Forest* (TES), the process name has been changed to the Terrestrial Ecosystem Unit Inventory (TEUI); this avoids confusion with Threatened and Endangered Species (TES).

2017 monsoon season, the Hyde Fire burned over 17,000 acres within the project area. Although it was a lightning-caused unplanned ignition, it was determined that the best approach would be to manage it to meet resource objectives. The resulting mosaic of burned and unburned vegetation fit within the proposed treatment prescription for the area.

Fire Regime

A fire regime, like any natural disturbance regime is a means of describing the disturbance according to its relevant descriptive characteristics. There are two key classifications for fire regime which are used in this report: Fire Regime Type, and Fire Regime Condition Class (FRCC).

Fire Regime Type, the standard system for fire regime classification, is based on fire frequency (the average number of years between fires), and fire severity (based on the percent removal of dominant overstory vegetation). The five standard fire regime types as described in the 2010 FRCC Guidebook, are shown below in Table 1. A natural fire regime is a general classification of the role fire would play across a landscape in the absence of human mechanical intervention, but including the influence of aboriginal burning (Agee, 1993).

Table 1. Fire Regime Type definitions

Fire Regime	Description
I	0-35 year frequency. Low severity (surface fires most common), to mixed severity (less than 75% of the dominant overstory vegetation replaced).
II	0-35 year frequency. High severity (stand replacement, with greater than 75% of the dominant overstory vegetation replaced).
III	35-100+ year frequency. Mixed severity (less than 75% of the dominant overstory vegetation replaced).
IV	35-100+ year frequency. High severity (stand replacement).
V	200+ year frequency. High severity (stand replacement).

FRCC is a description of deviation from natural fire regime, based on the following criteria: vegetation characteristics, fuel composition, fire frequency, and fire severity (Table 2). Fire regime condition class (FRCC) has typically been calculated using LANDFIRE. The LANDFIRE project was used to create an integrated product suite at 30 m spatial resolution for all lands within the United States; and since its completion in 2005, has been used to support landscape-level fire management planning (Forest Service, 2006).

Though LANDFIRE has been beneficial at landscape scales the accuracy can diminish at lower scales, so Region 3 staff developed a model called the R3 FRCC Tool. The benefits to using the Forest Service Southwestern Region FRCC Tool is that it is specific to Southwestern Region (Region 3) ecosystems and can be calculated at finer scales (5th code (HUC 10) watersheds). On the Prescott NF, FRCC has been

calculated for each PNVT by 5th code watershed. FRCC is calculated from ecosystem departure, reference average fire severity, current average fire severity, reference mean fire frequency and current fire rotation summary (see Figure 1).

Table 2. Fire Regime Condition Class (FRCC) definitions

| Fire Regime Condition Class	Description	Potential Risks
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	• Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. • Composition and structure of vegetation and fuels are similar to the natural (historical) regime. • Risk of loss of key ecosystem components (e.g. native species, large trees, and soil) are low • Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe).
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	• Composition and structure of vegetation and fuel are moderately altered. • Uncharacteristic conditions range from low to moderate; • Risk of loss of key ecosystem components are moderate • Fire behavior, effects and other associated disturbances are highly departed (more or less severe).
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances	• Composition and structure of vegetation and fuels are highly altered. • Uncharacteristic conditions range from moderate to high. • Risk of loss of key ecosystem components are high
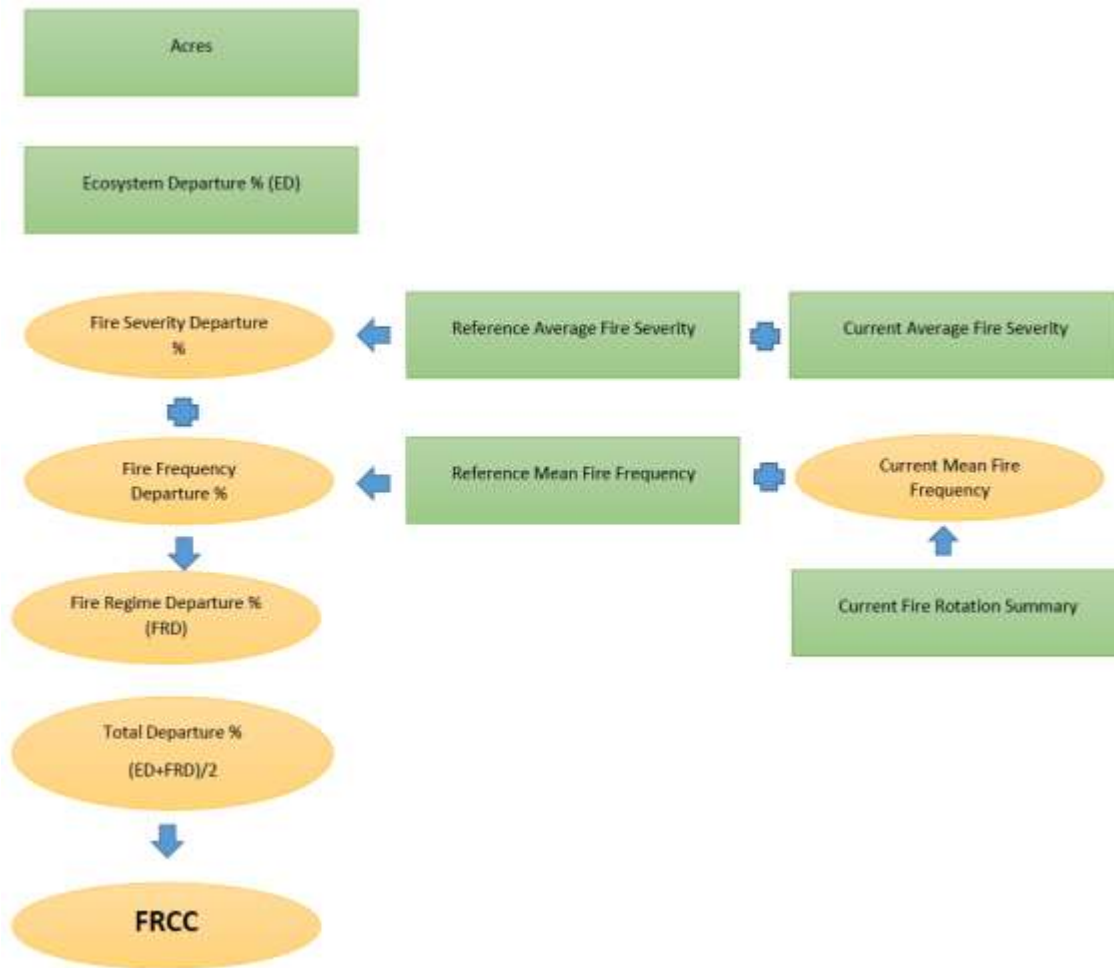
Figure 1. Model flow of the R3 FRCC Tool. Green boxes indicate area where data is inputted and yellow ovals indicate a calculation.

Reference Average Fire Severity, Current Average Fire Severity, Reference Mean Fire Frequency and Current Fire Rotation Summary were calculated by Region 3 regional staff, and using desired conditions from the Forest Plan, Ecosystem Departure was calculated in house. The model compares Reference Average Fire Severity and Current Average Fire Severity to calculate Fire Severity Departure (%). Reference Mean Fire Frequency and Current Fire Rotation Summary are compared to calculate Fire Frequency Departure (%). After Fire Severity Departure (%) and Fire Frequency Departure (%) are calculated both are averaged together to calculate Fire Regime Departure (%). Ecosystem Departure (%) and Fire Regime Departure (%) are then averaged together and the result is Total Departure (%).

If Total Departure is ≤33%, FRCC equals 1; if total departure is greater than 33% but less than or equal to 66% FRCC equals 2; and if total departure is greater than 66%, FRCC equal 3.
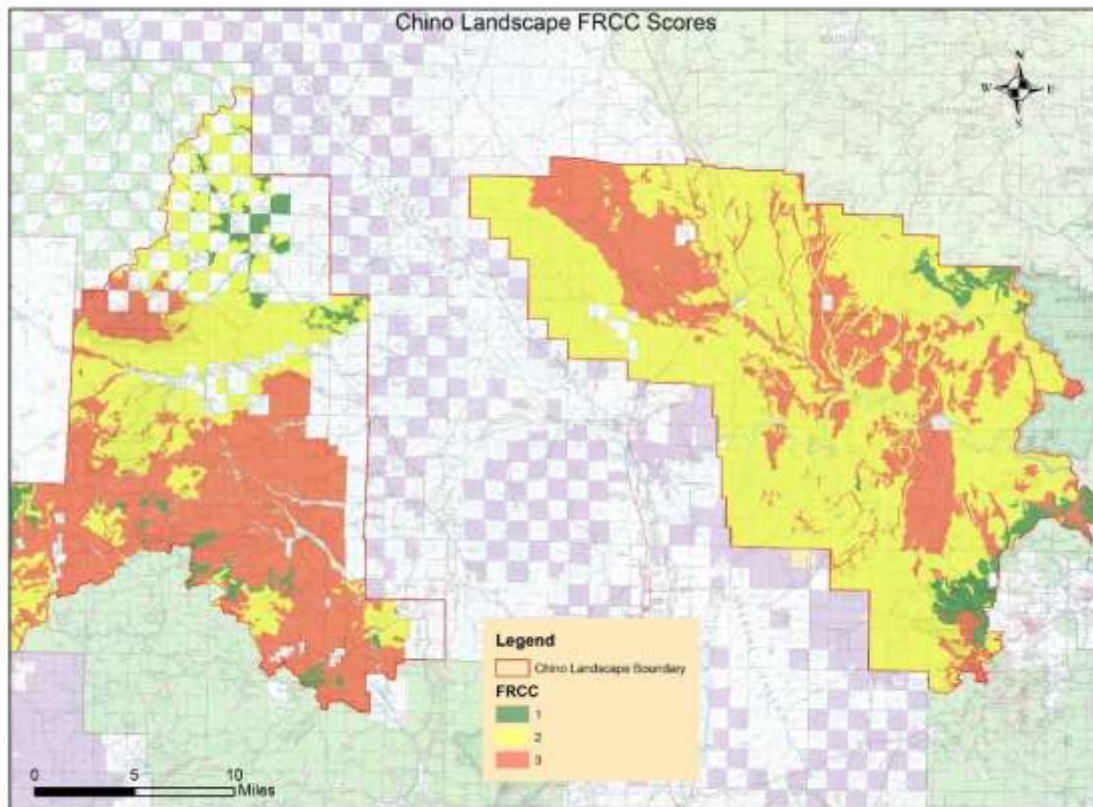
Figure 2. FRCC scores in the Chino Landscape Project area.

Air Quality

ADEQ is the regulatory agency responsible for managing Arizona's air quality. The National Forests in Arizona are considered partners in this effort. ADEQ has developed specific statutes derived from the Environmental Protection Agency's 'National Ambient Air Quality Standards' (NAAQS) that regulate smoke emission activities within the State. These can be found in the Arizona Administrative Code (AAC), Title 18. Environmental Quality, Article 15. *Forest and Range Burns*. Each National Forest in the State is required to follow the procedures found here to help minimize degradation of Arizona's air quality. Smoke is simply the byproduct of fire and as such there is an expectation to produce smoke when managing natural resources with fire. Opportunities for prescribed fire, whether broadcast burning or burning piled vegetation must go through various levels of scrutiny by ADEQ to insure air quality standards are maintained.

Environmental Consequences

Within the Great Basin Grassland PNVT, fire is the natural means of invigorating grass and controlling brush and tree expansion. Wildfires and prescribed fires tend to burn across the landscape in mosaic patterns leaving unburned islands. These islands produce numerous resource benefits including visual quality, soils retention, water deceleration, as well as serving as species reservoirs for population stability for flora and fauna.

Within the Ponderosa Pine, Piñon-Juniper - Evergreen Shrub, and Juniper Grassland PNVTs, re-introduction of fire, where feasible, into these areas will yield resource benefits. The resource benefits of reintroducing prescribed fire as well as managing wildfire for resource benefits is discussed in detail in each of the specialist reports for this project.

The desired FRRC for all PNVTs is an FRCC 1. Within all PNVTs, wildland fire will maintain, or maintain and move towards desired conditions. Some PNVTs, such as Ponderosa Pine, will need time to reflect a change in the desired condition. Over time, different seral states will be achieved, such as old growth characteristics. Utilizing prescribed wildland fire will result in reduced fuel loading as well as a reduction in the threat of a stand replacing fire within the ponderosa pine ecosystems.

Wildfires within the GB Grassland contributes to the maintenance of this PNVT by reducing the spread of junipers into the grassland. The desired fire return interval for the GB Grasslands is 10 to 30 years.

Wildfires as well as mechanical thinning operations within the Piñon-Juniper - Evergreen Shrub PNVTs will reduce the tree and shrub density, thus, creating openings. Within these openings, it can be expected to see native perennial and annual grasses as well as perennial forbs. The desired fire return interval in the Piñon-Juniper-Evergreen Shrub PNVTs is 35 to 100 years.

Within Juniper Grasslands, wildfire will maintain tree canopy cover at a level of 5 to 30 percent. Wildfire will also stimulate regrowth and germination of perennial grasses and forbs.

In the Piñon-Juniper Woodland PNVT, approximately half of this PNVT is Tier 2. Although Tier 2 areas will not be targeted specifically, they may be included in burn blocks, should they be located within a targeted Tier 1 area. Approximately one quarter of this PNVT is identified as Tier 4 due to steep slopes and soil type, and therefore will not be treated at all. The remaining one quarter is identified as Tier 1 and fire will be used as a maintenance tool following thinning operations to help create openings. Within these openings, it can be expected to see native perennial and annual grasses, as well as perennial forb growth. Fire return interval within this PNVT is 35 to 200 years.

Wildfires within the Interior Chaparral will create a mosaic pattern, a diverse age class, as well as maintain an FRCC 1 across the landscape.

Although prescribed fire implementation will not target areas within the Riparian Gallery PNVT, fire will not be excluded from these areas intentionally. In such cases that prescribed fire operations are occurring near riparian areas, fire will be allowed to back into the riparian areas, and will not be excluded or suppressed in these areas.

PNVT	Acres	Current FRCC	Proposed Action	Similarity to Vegetation Structure	Similarity to Fire Disturbance	Management Concerns
GB Grassland	25,493	1	Maintain	High	Moderate	Lack of desired fire disturbance; tree and shrub expansion.
Piñon-Juniper / Evergreen Shrub	254,341	2-3	Fire and thinning will change the score to a FRCC score 1-2	Low	Moderate	Tree and shrub density, lack of perennial grass and forbs.
Juniper Grasslands	82,493	2-3	Maintain and move toward desired condition	Moderate	Moderate	Lack of desired fire disturbance.
Ponderosa Pine - Emory Oak	21,252	3	Maintain and move toward desired condition	Low	Low	Increased tree and shrub density; Increased fuel loading; increased risk of high intensity fire.
Ponderosa Pine - Gamble Oak	13,169					
Piñon-Juniper Woodland	17,204	1-2	Maintain	High	High	Tree and shrub density, lack of perennial grass and forbs.
Interior Chaparral	14,580	1	Maintain	High	High	Wildfire threat to life and property.

Cumulative Effects

There are no present or reasonably foreseeable actions relevant to fuels or fire regime condition class within the analysis area. Recent disturbances, including prescribed burns in the Camp Wood area and the Hyde Fire (summer of 2017) have been accounted for in the current conditions during the analysis. Cumulative air quality impacts from prescribed burns in adjacent jurisdictions will be managed through coordination with ADEQ to avoid exceeding National Ambient Air Quality Standards. Therefore, it was determined that there are no cumulative effects from the proposed action or Alternative A.

References

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